

REMARKS

I. Introduction

In response to the Office Action dated June 1, 2006, Applicants have amended claims 11, 26 and 31 to further clarify the subject matter of the present invention. In addition, new claims 33 and 34 have been added. Support for the amendment to claims 11 and 31 may be found, for example, on page 10, lines 6-20 and Fig. 2A of the specification. Support for new claims 33 and 34 may be found, for example, on page 6, lines 28-31 and on page 10, line 17 of the specification, respectively. No new matter has been added.

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art references.

II. The Rejection Of Claims 11 And 31 Under 35 U.S.C. § 103

Claims 11 and 24-25 were rejected under 35 U.S.C. § 103(a), as being unpatentable over Molnar (USP No. 6,086,673) in view of Iida et al. (JP 53-028374); claim 26 as being unpatentable over Molnar in view of Iida and further in view of Sasaki (USP No. 4,348,803); claims 28-31 as being unpatentable over Molnar in view of Iida and further in view of Olsen et al. ("Calculated Stresses in Multilayered Heteroepitaxial Structures"); and claim 32 as being unpatentable over Molnar in view of Iida and further in view of Olsen and further in view of Nakamura (USP No. 5,290,393). Applicants respectfully traverse these rejections for at least the following reasons.

Claims 11 and 31, as amended, each recite, in part, an epitaxial growth method which recites that the epitaxial layer is grown on the opposite side of the sapphire from that of the silicon layer after formation of the silicon layer.

In contrast to the present invention, Molnar and Iida both fail to teach or suggest growing the epitaxial layer on the opposite side of the sapphire from that of the silicon layer, after formation of the silicon layer. It was alleged that Iida teaches growing a single crystal or polycrystalline Si only on the back surface of a sapphire single crystal wafer to reduce warpage of the wafer (see, Abstract of Iida). However, it appears that the Examiner misinterprets Iida. Iida teaches only the growth of *silicon on both sides* of the sapphire. Furthermore, there is no mention of a specific order in which the layers are formed, because Iida teaches only the growth of silicon on both sides of the sapphire and therefore, there is no differentiation between the front and back sides of the sapphire.

In contrast, the present invention requires that the epitaxial layer, for instance, GaN, be grown *after* formation of the silicon layer. As Iida fails to disclose the growth of an epitaxial layer, it is not obvious based upon Iida, to grow a silicon layer on the back side of the sapphire before growing the epitaxial layer, because as stated above, Iida forms silicon on both sides of the sapphire. This limitation is important, because if the GaN layer is formed on the sapphire first, the GaN would be degraded during the growth of silicon on the opposing side by hydrogen which etches the surface of the GaN. Thus, as Molnar also fails to teach or suggest growing an epitaxial layer on a sapphire substrate after forming a silicon layer on the opposite side, the combination of the two references as suggested in the Office Action fails to disclose this limitation of claims 11 and 31. Accordingly, Applicants submit that the proposed combination of Molnar and Iida fails to render claims 11 and 31 of the present invention obvious.

Moreover, it is noted that there is no teaching or suggestion in the Olsen reference that cures the deficiencies of Molnar or Iida with respect to claim 31.

In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 180 USPQ 580 (CCPA1974). As Molnar, Iida and Olsen, all fail to teach or suggest an epitaxial growth method comprising the step of: the epitaxial layer is grown on the opposite side of the sapphire from that of the silicon layer after formation of the silicon layer, it is submitted that Molnar, Iida and Olsen do not render claims 11 and 31 obvious. Accordingly, it is respectfully requested that the § 103 rejection of claims 11, 31 and any pending claims dependent thereon be withdrawn.

III. All Dependent Claims Are Allowable Because The Independent Claim From Which They Depend Is Allowable

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claims 11 and 31 are patentable for the reasons set forth above, it is respectfully submitted that all pending dependent claims are also in condition for allowance.

IV. Conclusion

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication of which is respectfully solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper;

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including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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